JAPAN

EDICT OF GOVERNMENT

JIS K 1571 (2004) (English): Wood preservatives -- Performance requirements and their test methods for determining effectiveness

The citizens of a nation must honor the laws of the land.

Fukuzawa Yukichi

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JIS K 1571 : 2004

(JWPA/JSA)

Test methods for determining the effectiveness of wood preservatives and their performance requirements

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Reference number : JIS K 1571 : 2004 (E)

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Wood Preserving Association (JWPA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS K 1571** : 1998 is replaced with this Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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In the event of any doubts arising as to the contents, the original JIS is to be the final authority.

Contents

Test methods for determining the effectiveness of wood preservatives and their performance requirements

1 Scope This Japanese Industrial Standard specifies the test method for antiseptic performance, test method for termite proofing performance and test method for iron corrosion property of wood preservatives and their performance requirements.

Remarks : The test methods for antiseptic and termite proofing performance of wood preservatives to be used in the limited service condition shall be in accordance with annex.

2 Normative references The standards listed in attached table 1 contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) shall be applied.

3 Definitions For the purposes of this Standard, the definitions given in **JIS K 1570** and the following definitions apply.

a) **surface treatment** the treatment to supply wood preservatives on wood surface by using a brush, a sprayer, a vessel and others

b) **coating treatment** the treatment to coat wood preservatives on wood surface by using a brush and the others

c) **spraying treatment** the treatment to spray wood preservatives on wood surface by using a sprayer and the like

d) **immersion treatment** the treatment to sink wood in wood preservatives by using a vessel and others

e) **antiseptic performance** the effectiveness of wood preservatives treated on woods to prevent the deterioration caused by a rotting fungus

f) **termite proofing performance** the effectiveness of wood preservatives treated on woods to prevent the vermin damage caused by termite

g) **iron corrosion property** the corrosion property to iron of the woods treated by wood preservatives

h) **water soluble wood preservatives** the wood preservatives to be used by dissolving in water

i) **oil based wood preservatives** the oily wood preservatives to be used with the stock solution as it is

j) **oil soluble wood preservatives** the wood preservatives to be used by dissolving in organic solvent

k) **Emulsified wood preservatives** the wood preservatives to be used by emulsifying in water

4 Test methods

4.1 Preparation of sample Take an appropriate quantity from the wood preservatives intended to test so as to represent their quality, and in the case of oil soluble wood preservatives, prepare the wood preservatives to the specified concentration (mass percentage %) to be put to practical use by using the solvent specified by the manufacturer and take it as the sample, in the case of water soluble and emulsified wood preservatives, prepare to the specified concentration (mass percentage %) by using the deionized water, A2, specified in **JIS K 0557** and take it as the sample, and in the case of oil based wood preservatives, take the stock solution as it is as the sample.

4.2 Antiseptic performance test

4.2.1 Indoor test

4.2.1.1 Injection treatment use

4.2.1.1.1 Material

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and shall be taken from the same wood in air dried state.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm, and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 20 mm × 20 mm at end surface of lumber and 10 mm in height. The dimensional tolerance of end surface of lumber and height shall be ± 0.5 mm.

5) The wood piece shall be dried in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, left in a desiccator for approximately 30 min as it is, then weighed of the mass to the nearest 0.01 g and stored in a desiccator so as not to be humidified.

b) **Test fungus** For the test fungus, the following two classes of strain (1) shall be used, and tested respectively.

Fomitopsis palustris (Berk. et Curt.) Gilbn. & Ryv. FFPRI 0507

Trametes versicolor (L.: Fr.) Pilát FFPRI 1030

Note (1) These are the standard fungi separated by Forestry and Forest Product Research Institute (FFPRI).

c) **Culture bottle** The culture bottle shall be a cylindrical wide-mouthed container having 50 cm^2 to 100 cm^2 in bottom area and 500 ml to 900 ml in whole capacity.

d) **Culture medium** For the culture medium, approximately 350 g of sea sand(2) is put in a culture bottle, 100 ml of culture solution(3) adjusted at 5.5 to 6.0 in pH is added then sterilized(4). After sterilized, the surface of sea sand is made level so that the surface of culture solution is made at the same level of the surface of sea sand.

Notes (2) The sea sand shall be grade 1 No. 1 specified in **JIS K 8222**, and be washed and dried before used.

(3) The composition of culture solution shall contain 4.0 % of D(+)-glucose specified in **JIS K 8824** in mass percentage, 0.3 % peptone in mass percentage and 1.5 % of malt extracted matter in mass percentage.

(4) For the sterilization, an autoclave sterilization shall be carried out at 120 °C for 30 min.

e) **Culture fungus** One piece of wood piece for inoculation(5) is aseptically put nearby at the central part of the surface of culture medium in **4.2.1.1.1 d**), and cultured in the test place at 26 °C ± 2 °C in temperature and not less than 70 % in relative humidity. The colony, which spread sufficiently on the culture medium for 10 days to 15 days, shall be taken as culture fungus and used for antibacterial operation.

Note (5) The wood piece for inoculation is prepared so that the test fungus is inoculated on gelatin culture medium, cultured in a test place at 26 °C ± 2 °C and, when colony spreads sufficiently, a piece of beech absorbed of water and sterilized (approximately 2 mm square, approximately 1 mm in thickness) is aseptically placed on the colony, cultured for 5 days to 6 days and the test fungus is propagated.

4.2.1.1.2 Specimen The specimen shall be three classes such as treated specimen, specimen for correction and non-treated specimens, and shall respectively be as follows.

a) **Treated specimen** The treated specimen shall be as follows:

1) Put the wood piece placed in a beaker in a vacuum desiccator and others, depressurize it, recover to the normal pressure as absorbing the sample, and leave it for a while as it is. Then, take out the wood piece from the sample, wipe it lightly, and immediately weigh the mass to the nearest 0.01 g.

2) Calculate the sample absorption rate of wood piece according to formula (1), and round off the first decimal place to make an integer.

$$A_1 = \frac{m_2 - m_1}{m_1} \times 100 \quad \cdots\cdots (1)$$

where, A_1 : sample absorption rate (%)

m_1 : mass of the wood piece in **4.2.1.1.1 a**) **5**) (g)

m_2 : mass of the wood piece in **4.2.1.1.2 a**) **1**) (g)

3) Select to take the specified number of treated specimens of (250 ± 10) % in the sample absorption rate of wood piece for water soluble or emulsified sample, or (200 ± 10) % in the sample absorption rate of wood piece for oil based or oil soluble sample, and leave it at room temperature for 20 days or longer.

b) **Specimen for correction**, prepared by treating oil based sample or oil soluble sample as similarly as in **4.2.1.1.2 a**), and used for the correction of test results.

c) **Non-treated specimen**, the wood piece specified in **4.2.1.1.1 a**) and used for the judgement of activity of culture fungus in antibacterial operation.

d) **Number of specimens** The number of specimens shall be 9 in repetition number, and the number per one sample shall be as shown in table 1.

Table 1 Number of specimens in antiseptic performance test of wood preservatives for injection treatment

Class of specimen	Class of fungus	Repetition number			
		Water soluble or emulsified		Oil based or oil soluble	
		Repetition number	Total	Repetition number	Total
Treated specimen	2	9	18	9	18
Specimen for correction	—	—	—	9	9
Non-treated specimen	2	9	18	9	18
Number required	—	—	36	—	45

4.2.1.1.3 Test After carrying out a weathering operation on each specimen, carry out an antibacterial operation. Provided that, for the specimen for correction, use the culture medium prepared by the method specified in **4.2.1.1.1 d**) except for using the deionized water, A2, specified in **JIS K 0557** in place of culture medium, put a heat-resistant net on the aseptic culture medium, place the specimen for correction on it, thereafter carry out the operation in accordance with **4.2.1.1.3 b**).

a) **Weathering operation** Take 9 pieces of each specimen as one set, put it in a 500 ml beaker respectively, add the deionized water, A2, specified in **JIS K 0557** by 10 times amount of specimen volume, sink the specimen below the water surface. After agitating for 8 h by rotating a rotor at 400 r.p.m. to 450 r.p.m. at 25 °C ± 3 °C by using a magnetic stirrer and eluviate (that means to solve out the water soluble sample from specimen, hereafter referred to as "eluviation".) the specimen, immediately remove the water on the specimen surface lightly. Successively, put it gently in a circulating type dryer at 60 °C ± 2 °C for 16 h, and volatilize the volatile content. Repeat the above-mentioned operation 10 times alternatively.

After dry the specimen with weathering operation finished in a circulating type drier at 60 °C ± 2 °C in temperature for 48 h, leave it in a desiccator for approximately 30 min as it is, and weigh the mass to the nearest 0.01 g.

b) **Antibacterial operation** Put the treated specimen and the non-treated specimen on the culture fungus specified in **4.2.1.1.1 e**) with 3 pieces every one culture bottle directly for trametes versicolor or with a heat-resistant plastics net sterilized of approximately 1 mm in thickness put on for fomitopsis palustris. Place the specimen on it so as to make the direction of fibre vertical and place it in a test place at 26 °C ± 2 °C in temperature and at least 70 % in relative humidity for 12 weeks.

After antibacterial operation has finished, take out the specimen, remove the adhered matter on the surface such as mycelium sufficiently, dry it in air for approximately 24 h, then dry it in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, leave it in a desiccator for approximately 30 min as it is, and weigh the mass to the nearest 0.01 g.

4.2.1.1.4 Calculation The mass decrease rate of each specimen shall be calculated according to formula (2), and the mean value shall be obtained.

In addition, the calculation of the average ($\bar{x}$) and standard deviation (s) of mass decrease rate shall be carried out according to **JIS Z 9041-1** and made to an integer by rounding off the first decimal place.

$$L_1 = \frac{m_3 - m_4}{m_3} \times 100 \quad \cdots\cdots (2)$$

where, L_1 : mass decrease rate (%)

m_3 : mass of the specimen in **4.2.1.1.3 a**) (g)

m_4 : mass of the specimen in **4.2.1.1.3 b**) (g)

The mass decrease rate (%) of treated specimen shall be obtained so that the average mass decrease rate (%) of specimen for correction is subtracted from the mass decrease rate of the specimen with antibacterial operation finished.

4.2.1.1.5 Effectiveness of test When the average mass decrease rate of non-treated specimen tested at the same time of the treated specimen in **4.2.1.1.3** is under 30 % for fomitopsis palustris or under 15 % for trametes versicolor, the test shall be carried out again.

4.2.1.2 Surface treatment use

4.2.1.2.1 Material

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece to be used for test shall be a normal and sound cryptomeria sapwood.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm, and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 5 mm × 20 mm at end surface of lumber and 40 mm in length, and the surface of 20 mm × 40 mm shall be the grain face. The dimensional tolerance of end surface of lumber and height shall be ± 0.5 mm.

5) The end surface of lumber shall be sealed by using the epoxy resin paint specified in **JIS K 5551** and after the resin has hardened, the mass shall be weighed to the nearest 0.01 g in air dry state.

b) **Test fungus** The test gangues shall be in accordance with **4.2.1.1.1 b**).

c) **Culture bottle** The culture bottle shall be in accordance with **4.2.1.1.1 c**).

d) **Culture medium** The culture medium shall be in accordance with **4.2.1.1.1 d**).

e) **Culture fungus** The culture fungus shall be in accordance with **4.2.1.1.1 e**).

4.2.1.2.2 Specimen The specimen shall be separated into two classes such as treated specimen and non-treated specimen, and shall be follows, respectively.

a) **Treated specimen** The treated specimen shall be as follows:

1) The wood piece shall be treated by coating, spraying or immersing the sample, and the mass shall be weighed to the nearest 0.01 g. Provided that, for immersion treatment, the mass shall be weighed immediately after the surface of wood piece after treated is lightly wiped with the filter paper (for chemical analysis) specified in **JIS P 3801**.

2) The sample treatment amount of wood piece shall be calculated according to formula (3), and made to an integer by rounding off the first decimal place.

$$B_1 = \frac{m_6 - m_5}{T_1} \quad \cdots\cdots (3)$$

where, B_1 : sample treatment amount (g/m²)

m_5 : mass of the wood piece in **4.2.1.2.1 a**) **5**) (g)

m_6 : mass of the treated specimen in **4.2.1.2.2 a**) **1**) (g)

T_1 : surface area of wood piece in **4.2.1.2.1 a**) **4**) (m²)

3) The treated specimen shall be 110 g/m² ± 10 g/m² in sample treatment amount of wood piece, and be left in room temperature for at least 7 days as it is.

b) **Non-treated specimen** The non-treated specimen shall be the wood piece specified in **4.2.1.2.1 a**) and be used for the judgement of activity of culture fungus in antibacterial operation.

c) **Number of specimens** The number of specimens shall be 9 in repetition number and the number per one sample shall be in accordance with table 2.

Table 2 Number of specimens in antiseptic performance test of wood preservatives for surface treatment

Class of specimen	Class of fungus	Repetition number	Total
Treated specimen	2	9	18
Non-treated specimen	2	9	18
Number required	—	—	36

4.2.1.2.3 Test After weathering operation is carried out for each specimen, antibacterial test shall be carried out.

a) **Weathering operation** Take 9 pieces of each specimen as one set, put it in a 500 ml beaker respectively, add ten times amount of specimen volume of the ionized water, A2, specified in **JIS K 0557**, sink the specimen in static water at 25 °C ± 3 °C. After placed gently for 5 h and eluviated, immediately remove the water on the surface of specimen lightly. Successively, place it gently in a circulating type dryer at 40 °C ± 2 °C in temperature for 19 h, and volatilize the volatile content. Repeat the above-mentioned operation 10 times alternatively.

Dry the specimen with the weathering operation finished in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, then place it in a desiccator for approximately 30 min as it is, and weigh the mass to the nearest 0.01 g.

b) **Antibacterial operation** For the antibacterial operation of treated specimen and non-treated specimen, put the net of heat resistant plastics sterilized of approximately 1 mm in thickness on the culture fungus specified in **4.2.1.1.1 e**), frame on it every 3 pieces per one culture bottle with a frame plate of tetrafluoroethylene resin of approximately 1 mm in thickness as shown in figure 1, sterilize(6) it, place it with the surface of plate of 40 mm × 5 mm downward, and place it in a test place at 26 °C ± 2 °C in temperature and 70 % or over in relative humidity for 12 weeks.

Note (6) The sterilization shall be carried out by using ethyleneoxide gas at a room temperature for at least 5 h.

After the antibacterial operation has finished, take out the specimen, remove the adhered matter on the surface such as mycelium sufficiently, dry it in air for approximately 24 h, then dry it at 60 °C ± 2 °C in temperature for 48 h, leave it in a desiccator for approximately 30 min, and weigh the mass to the nearest 0.01 g.

Unit: mm

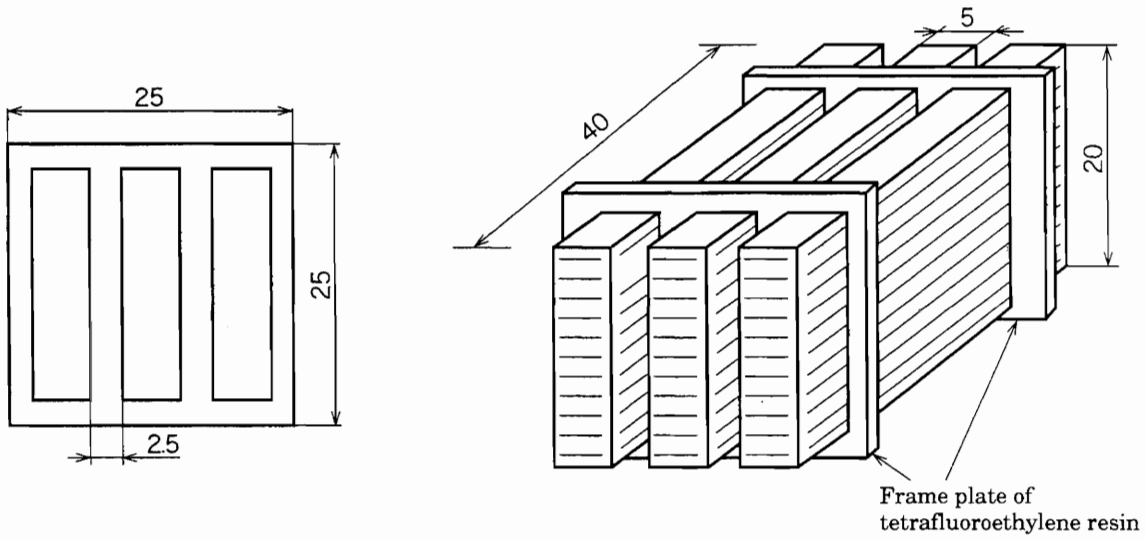

Figure 1 Specimen framed in frame plate of tetrafluoroethylene resin

4.2.1.2.4 Calculation The mass decrease rate of each specimen shall be calculated according to formula (4) and the mean value shall be obtained.

The calculation of the average ($\bar{x}$) and standard deviation (s) of mass decrease rate shall be carried out according to **JIS Z 9041-1** and made to an integer by rounding off the first decimal place.

$$L_2 = \frac{m_7 - m_8}{m_7} \times 100 \quad \text{..... (4)}$$

where, L_2 : mass decrease rate (%)

m_7 : mass of the specimen in **4.2.1.2.3 a**) (g)

m_8 : mass of the specimen in **4.2.1.2.3 b**) (g)

4.2.1.2.5 Effectiveness of test When the average mass decrease rate of the non-treated specimen tested at the same time of the treated specimen in **4.2.1.2.3** is under 30 % for fomitopsis palustris or under 15 % for trametes versicolor, the test shall be carried out again.

4.2.2 Fungus cellar test

4.2.2.1 Culture bottle test

4.2.2.1.1 Material

a) **Wood piece**

1) The wood piece shall be a normal and sound cryptomeria sapwood, and the wood piece to be used for the same test shall be taken from the same wood in air dried state.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 20 mm × 20 mm at end surface of lumber and 10 mm in height. The dimensional tolerance of end surface of lumber and height shall be ± 0.5 mm.

5) Dry the wood piece in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, place it in a desiccator for approximately 30 min as it is, then weigh the mass to the nearest 0.01 g and store it in a desiccator so as not to be humidified.

b) **Soil**

1) The soil to be used for test shall be the stratum A of forest soil or clay loam. The soil taken is passed through a sieve of 4 mm in opening just as field-moist soil to remove vegetation root, stone and others.

2) The pH (H_2O) of soil shall be within the range between 5.0 and 8.0.

3) The maximum water retention amount of soil shall be as follows:

— Attach the filter paper, class 2, of 55 mm in diameter specified in **JIS P 3801** to a Buchner funnel of the size to fit to it, put soil on the filter paper, tap this Buchner funnel on a table thrice lightly, and then scrape down the excess soil evenly with a microspatula. Set the Buchner funnel filled with soil up in a 300 ml beaker, pour the deionized water,

A2, specified in **JIS K 0557** in this beaker so that the water level becomes higher than the position of the filter paper, and leave it at a room temperature for 12 h. Suck in the Buchner funnel taken out from the beaker by using an aspirator for 15 min as covering the exposed surface of soil with a piece of moistened cloth. Immediately, take approximately 15 g from the soil removed of excess moisture and put it in a 100 ml beaker, dry it in a dryer at 105 °C ± 3 °C in temperature for 24 h, leave it in a desiccator for approximately 30 min, and then weigh the mass to the nearest 0.01 g.

— Calculate the maximum water retention amount of the soil according to formula (5), and round off the first decimal place to make an integer.

$$H = \frac{m_9 - m_{10}}{m_{10}} \times 100 \quad \cdots\cdots (5)$$

where, H : maximum water retention amount (%)

m_9 : mass of the soil before drying (g)

m_{10} : mass of the soil after drying (g)

— Regulate the moisture content of soil so as to be equivalent to the maximum water retention amount.

c) **Culture bottle** The culture bottle shall be a cylindrical wide-mouthed bottle with screw cap, of 100 cm^2 in bottom area and 900 ml in whole capacity.

d) **Soil fungus bed** Put soil in a culture bottle up to approximately half of its capacity, as occasion demands, spray sterilized water to agitate sufficiently so as to be equivalent to the maximum water retention amount of soil, flatten the soil surface and tap the culture bottle thrice on a table lightly so as to get rid of the void in soil as much as possible.

4.2.2.1.2 Specimen The specimen shall be separated into two classes such as a treated specimen and a non-treated specimen, and shall be as follows, respectively.

a) **Treated specimen** The treated specimen shall be as follows:

1) Put the wood piece placed in a beaker in a vacuum desiccator and others, depressurize it, recover to the normal pressure as absorbing the sample, and leave it for a while as it is. Then, take out the wood piece from the sample, wipe it lightly, and immediately weigh the mass to the nearest 0.01 g.

2) Calculate the sample absorption rate of wood piece according to formula (6), and round off the first decimal place to make an integer.

$$A_2 = \frac{m_{12} - m_{11}}{m_{11}} \times 100 \quad \cdots\cdots (6)$$

where, A_2 : sample absorption rate (%)

m_{11} : mass of the specimen in **4.2.2.1.1 a) 5)** (g)

m_{12} : mass of the specimen in **4.2.2.1.2 a) 1)** (g)

3) Select to take the specified number of treated specimens of (250 ± 10) % in the sample absorption rate of wood piece for water soluble or emulsified sample, or (200 ± 10) % in the sample absorption rate of wood piece for oil based or oil soluble sample, and leave it at a room temperature for 20 days or longer.

b) **Non-treated specimen**, being the wood piece specified in **4.2.1.1.1 a**) and used for the judgement of activity of culture fungus in antibacterial operation.

c) **Number of specimens** The number of specimens shall be 9 in repetition number per one sample for both treated specimen and non-treated specimen.

4.2.2.1.3 Test The weathering operation shall be carried out on the specimen, and then the antibacterial operation shall be carried out.

a) **Weathering operation** The weathering operation shall be in accordance with **4.2.1.1.3 a**).

b) **Specimen with weathering operation finished** Dry the specimen with weathering operation finished in a circulating type dryer at 60 °C ± 2 °C for 48 h, leave it in a desiccator for approximately 30 min as it is, and weigh the mass to the nearest 0.01 g.

c) **Antibacterial operation** Bury the treated specimen and non-treated specimen in approximately 10 mm in depth of the soil fungus bed prepared according to the method specified in **4.2.2.1.1 d**) every 3 pieces for each culture bottle, and place the culture bottle in the place of 26 °C ± 2 °C in temperature and at least 70 % in relative humidity for 1 year. Supply the lost moisture by spaying sterilized water to the culture bottle with specimen buried monthly so as to maintain the moisture of soil fungus bed.

d) **Specimen with antibacterial operation finished** After the finishing of antibacterial operation, take out the specimen, remove the soil on surface and other adhered matter sufficiently, and wash it lightly by water. After drying it in air for approximately 24 h, dry it in a circulating type dryer at 60 °C ± 2 °C for 48 h, leave it in a desiccator for approximately 30 min, and weigh the mass to the nearest 0.01 g.

4.2.2.1.4 Calculation The mass decrease rate of each specimen shall be calculated according to formula (7) and the mean value shall be obtained.

The calculation of the average ($\bar{x}$) and standard deviation (s) of mass decrease rate shall be carried out according to **JIS Z 9041**-1, and shall be made to an integer by rounding off the first decimal place.

$$L_2 = \frac{m_{13} - m_{14}}{m_{13}} \times 100 \quad \cdots\cdots (7)$$

where, L_2 : mass decrease rate (%)

m_{13} : mass of the specimen in **4.2.2.1.3 b**) (g)

m_{14} : mass of the specimen in **4.2.2.1.3 d**) (g)

4.2.2.1.5 Effectiveness of test When the average mass decrease rate of the non-treated specimen tested at the same time of the treated specimen in **4.2.2.1.3** is under 10 %, the test shall be carried out again.

4.2.2.2 Rot vessel test

4.2.2.2.1 Materials

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and the wood piece to be used for the same test shall be taken from the same wood in air dried state.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 20 mm × 20 mm at end surface of lumber and 100 mm in length. The dimensional tolerance of end surface of lumber and length shall be ±0.5 mm.

5) The wood piece shall be weighed on the mass to the nearest 0.1 g in air dried state.

b) **Soil**

1) The soil to be used for test shall be prepared by mixing kanumatsuchi(7) or vermiculite(8) with clay loan according to **4.2.2.1.1 b) 1)** or sea sand(2).

2) The moisture content of soil shall be regulated to (50 ± 5) % of the maximum water retention amount obtained in **4.2.2.1.1 b) 3)**.

Notes (7) Kanumatsuchi shall be the fine grain for horticulture.

(8) Vermiculites shall be that specified in **JIS A 5009** or that for horticulture equivalent to these.

c) **Rot vessel** The rot vessel shall be made of plastics or concrete, attached with a drain, not deformed during the testing period and not contain any chemicals to affect seriously on the soil to be used for the test. The rot vessel shall be 0.6 m in width, 0.8 m in length and 0.5 m in depth in the minimum dimension, and have sufficient space capable of receiving the specimen at the same time. For the purpose of controlling the soil moisture, the surface of rot vessel shall be covered by using plastics film and others.

d) **Soil fungus bed** For the purpose of facilitating the removal of excess water in rot vessel, the gravels of 10 mm to 20 mm in particle diameter, are laid up to the height of at least approximately 30 mm from the bottom, the soil specified in **4.2.2.2.1 b)** is put on the upper layer up to the height of at least 0.3 m and the soil surface shall be smoothed. It is allowed to maintain the activity of rotting fungus by adding appropriately the decayed wood, humus soil and others taken from the field.

4.2.2.2.2 Specimen The specimen shall be separated into two classes such as a treated specimen and a non-treated specimen, and shall be as follows, respectively.

a) **Treated specimen** The treated specimen shall be as follows:

1) Put the wood piece placed in a beaker in a vacuum desiccator and others, depressurize it, recover to the normal pressure as absorbing the sample, and leave it for a while as it is. Then, take out the wood piece from the sample, wipe it lightly, and immediately weigh the mass to the nearest 0.1 g.

2) Calculate the sample absorption amount of wood piece according to formula (8), and round off the first decimal place to make an integer.

$$C_1 = \frac{m_{16} - m_{15}}{V_1 \times 1\,000} \quad \cdots\cdots (8)$$

where, C_1 : sample absorption amount (kg/m^3)

m_{15} : mass of the wood piece in **4.2.2.2.1 a) 5)** (g)

m_{16} : mass of the treated specimen in **4.2.2.2.2 a) 1)** (g)

V_1 : volume of the wood piece in **4.2.2.2.1 a) 4)** (m^3)

3) Select to take the treated specimen of 700 kg/m^3 or over in the sample absorption amount of wood piece for water soluble or emulsified sample, or 560 kg/m^3 or over in the sample absorption amount of wood piece for oil based or oil soluble sample, and leave it at a room temperature for 20 days or longer.

b) **Non-treated specimen**, being the wood piece specified in **4.2.2.2.1 a)** and used for the judgement of activity of soil fungus bed in rot vessel test.

c) **Number of specimens** The number of specimens shall be 5 in repetition number per one sample for both treated specimen and non-treated specimen.

4.2.2.2.3 Test After the weathering operation is carried out on the specimen, the antibacterial operation shall be carried out.

a) **Weathering operation** Five pieces of each specimen is made one set, and put in a 2 000 ml beaker respectively. The others shall be in accordance with **4.2.1.1.3 a)**.

b) **Antibacterial operation** Bury the treated specimen and the non-treated specimen as neighboring with approximately 80 mm in depth vertically in the longitudinal direction of specimen in the soil fungus bed of rot vessel installed in a room regulated at 25 °C to 30 °C in temperature. Add water on the soil surface uniformly so as not to dry excessively during this operation period, and maintain (50 ± 5) % in the maximum water retention amount as shown in **4.2.2.2.1 b) 2)** always.

c) **Judgement of rotted degree** The treated specimen and non-treated specimen shall periodically be taken out at least twice a year, and the condition of its part in the ground shall be observed and evaluated according to the following standard.

0 : Sound

1 : Partially slight rot

2 : Wholly slight rot

3 : Partially severe rot on the condition in 2

4 : Wholly sever rot

5 : Collapse of shape caused by rot

4.2.2.2.4 Calculation The mean value of rotted degree of treated specimen and non-treated specimen shall be obtained at the time of periodical observation. When the average rotted degree of treated specimen exceeds 2.5, the elapsed year shall be taken as the durable year of specimen.

4.2.2.2.5 Effectiveness of test When the average damaged degree is under 2.5, even if two years have elapsed from the time of installation of non-treated specimen, the test shall be carried out again.

4.2.3 Field test

4.2.3.1 Materials

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and shall be taken from the same wood in air dried state.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm, and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 30 mm × 30 mm at the end surface of lumber and 600 mm in length. The dimensional tolerance shall be ±0.5 mm for the end surface of lumber and ±2 mm for length.

5) The mass of wood piece shall be weighed to the nearest 0.1 g in air dried state.

4.2.3.2 Specimen The specimen shall be separated into two classes such as a treated specimen and a non-treated specimen, and shall be as follow, respectively. In addition, each specimen shall be able to distinguish from other specimen by attaching on the upper part of it with a highly-durable material of plate mentioned with a specimen number.

a) **Treated specimen** The treated specimen shall be as follows:

1) Put a wood piece in an injection apparatus, depressurize it, recover to the normal pressure as absorbing the sample, and leave it for a while as it is. Then, take out the wood piece from the sample, wipe it lightly, and immediately weigh the mass to the nearest 0.1 g.

2) Calculate the sample absorption amount of wood piece according to formula (9), and round off the first decimal place to make an integer.

$$C_2 = \frac{m_{18} - m_{17}}{V_2 \times 1\,000} \quad \text{..... (9)}$$

where, C_2 : sample absorption amount (kg/m³)

m_{17} : mass of the wood piece in **4.2.3.1 a) 5)** (g)

m_{18} : mass of the treated specimen in **4.2.3.2 a) 1)** (g)

V_2 : volume of the wood piece in **4.2.3.1 a) 4)** (m³)

3) Select to take the treated specimen of 700 kg/m³ or over in the sample absorption amount of wood piece for water soluble or emulsified sample, or 560 kg/m³ or over for oil based or oil soluble sample, and leave it at a room temperature for 20 days or longer.

b) **Non-treated specimen** The non-treated specimen shall be the wood piece specified in **4.2.3.1 a)**, and used for the judgement of activity of the soil micro-organism in the test place.

c) **Number of specimens** The number of specimens shall be 10 in repetition number per one sample for both treated specimen and non-treated specimen.

4.2.3.3 Test

a) **Test place** The test place shall be the place representing the district to be tested, and the bare ground covered with comparatively fertile soil.

b) **Test method** The treated specimen and non-treated specimen shall be arranged in a lattice shape so that each specimen is separated apart at least 0.45 m, and the specimen shall be buried vertically up to 0.3 m in depth below the ground surface.

c) **Judgement of rotted degree** The treated specimen and non-treated specimen shall be separated into a head part, a boundary ground part and an underground part, and be taken out to observe periodically at least once a year and evaluated according to **4.2.2.2.3 c)**.

4.2.3.4 Calculation The mean value of damaged degree of treated specimen and non-treated specimen shall be obtained at the time of periodical observation. The elapsed year, when the average damaged degree of treated specimen exceeds 2.5, shall be taken as the durable year of the specimen.

4.2.3.5 Effectiveness of test When the average damaged degree is under 2.5 even if 4 years have elapsed from the time of installation of non-treated specimen, the test shall be carried out again.

4.3 Termite proofing performance test

4.3.1 Indoor test

4.3.1.1 Injection treatment use

4.3.1.1.1 Material

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and shall be taken from the same wood in air dried state.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm, and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 20 mm × 20 mm at the end surface of lumber and 10 mm in height. The dimensional tolerance of end surface of lumber and height shall be ±0.5 mm.

5) Dry the wood piece in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, place it in a desiccator for approximately 30 min as it is, then weigh the mass to the nearest 0.01 g and store it in a desiccator so as not to be humidified.

b) **Test vermin** The test vermin shall be coptotermes(9).

Note (9) The coptotermes, distributed in the west and south of the Bohsoh peninsula, to damage buildings.

The scientific term is *Coptotermes formosanus* SHIRAKI, and regardless of the place to be taken.

c) **Breeding container** The breeding container shall be prepared so that the dental stone specified in **JIS T 6605** of approximately 5 mm in thickness is hardened in a part of an acrylic resin cylinder of 80 mm in diameter and 60 mm in height. This is placed in a container with a lid in which the moistured cotton added with 130 ml to 150 ml of water to the absorbent cotton 100 g of Japan Pharmacopoeia is previously spread all over by approximately 10 mm in thickness. A small hole has been opened in the lid for ventilating.

4.3.1.1.2 Specimen The specimen shall be separated into two classes such as a treated specimen and a non-treated specimen, and shall be follows, respectively.

a) **Treated specimen** The treated specimen shall be as follows:

1) Put the wood piece placed in a beaker in a vacuum desiccator and others, depressurize it, recover to the normal pressure as absorbing the sample, and leave it for a while as it is. Then, take out the wood piece from the sample, wipe it lightly, and immediately weigh the mass to the nearest 0.01 g.

2) Calculate the sample absorption rate of wood piece according to formula (10), and round off the first decimal place to make an integer.

$$A_3 = \frac{m_{20} - m_{19}}{m_{19}} \times 100 \quad \cdots\cdots (10)$$

where, A_3 : sample absorption rate (%)

m_{19} : mass of the wood piece in **4.3.1.1.1 a) 5)** (g)

m_{20} : mass of the treated specimen in **4.3.1.1.2 a) 1)** (g)

3) Select to take the specified number of treated samples of (250 ± 10) % in sample absorption rate of wood piece for water soluble or emulsified sample or (200 ± 10) % in sample absorption rate for oil based or oil soluble sample, and leave it at a room temperature for 20 days or longer.

b) **Non-treated specimen** The non-treated specimen shall be the wood piece specified in **4.3.1.1.1 a**) and used for the judgement of the activity of test vermin in vermin damage operation.

c) **Number of specimens** The number of specimens shall be 5 in repetition number for both treated specimen and non-treated specimen.

4.3.1.1.3 Test After the weathering operation is carried out, the vermin damage operation shall be carried out.

a) **Weathering operation** Five pieces of each specimen shall be taken as one set, and the others shall be in accordance with **4.2.1.1.3 a**).

b) **Specimen with weathering operation finished** Dry the specimen with weathering operation finished in a circulating type dryer at 60 °C ± 2 °C for 48 h, leave it in a desiccator for approximately 30 min as it is, and weigh the mass to the nearest 0.01 g.

c) **Vermin damage operation** The vermin damage operation shall be as follows.

1) Put a plastics net of approximately 1 mm in thickness on the dental stone in a breeding container specified in **4.3.1.1.1 c**), and put one piece of specimen on it so that the end surfaces of lumber become upward and downward.

2) Take the termite specified in **4.3.1.1.1 b**) from the nest at random, and throw 150 worker termites and 15 soldier termites into one breeding container.

3) Place the breeding container gently in a dark place at 28 °C ± 2 °C in temperature for 21 days. Remove the dead termite during test period quickly from the container.

d) **Specimen with vermin damage operation finished** After finishing of vermin damage operation, take out the specimen from the breeding container, remove the adhered matter on the surface of specimen sufficiently, dry it in air for approximately 24 h, then dry it in a circulating type drier at 60 °C ± 2 °C in temperature for 48 h, leave it in a desiccator for approximately 30 min as it is, and weigh the mass to the nearest 0.01 g.

4.3.1.1.4 Calculation The calculation shall be as follows:

a) **Mass decrease rate** The mass decrease rate of each specimen shall be calculated according to formula (11), and the mean value shall be obtained, and made to an integer by rounding off the first decimal place.

$$L_4 = \frac{m_{21} - m_{22}}{m_{21}} \times 100 \quad \cdots\cdots (11)$$

where, L_4 : mass decrease rate (%)

m_{21} : mass of the specimen in **4.3.1.1.3 b**) (g)

m_{22} : mass of the specimen in **4.3.1.1.3 d**) (g)

b) **Vermin mortality rate** The vermin mortality rate of worker termite shall be calculated according to formula (12), the mean value shall be obtained and made to an integer by rounding off the first decimal place.

$$M_1 = \frac{D_1}{150} \times 100 \quad \cdots\cdots (12)$$

where, M_1 : vermin mortality rate (%)

D_1 : total mortality number of worker termites in **4.3.1.1.3 c**)

4.3.1.1.5 Effectiveness of test When the average mass decrease rate of the non-treated specimen tested at the same time of the treated specimen in **4.3.1.1.3** is under 15 %, the test shall be carried out again.

4.3.1.2 Surface treatment use

4.3.1.2.1 Material

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and shall be taken from the same wood in air dried state. Provided that the sapwood Japanese black pine or Japanese red pine may be used in place of cryptomeria.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm, and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 10 mm × 10 mm at the end surface of lumber and 20 mm in height. The dimensional tolerance of end surface of lumber and height shall be ± 0.5 mm.

5) Dry the wood piece in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, place it in a desiccator for approximately 30 min as it is, then weigh the mass to the nearest 0.01 g and store it in a desiccator so as not to be humidified.

b) **Test vermin** The test vermin shall be in accordance with **4.3.1.1.1 b**).

c) **Breeding container** The breeding container shall be in accordance with **4.3.1.1.1 c**).

4.3.1.2.2 Specimen The specimen shall be separated into two classes such as a treated specimen and a non-treated specimen, and shall be as follows, respectively.

a) **Treated specimen**

1) The wood piece shall be treated by coating, spraying or immersing the sample, and the mass shall be weighed to the nearest 0.01 g. Provided that, for immersion treatment, the mass shall be weighed immediately after the surface of wood piece after treated is lightly wiped with the filter paper (for chemical analysis) specified in **JIS P 3801**.

2) The sample treatment amount of wood piece shall be calculated according to formula (13), and made to an integer by rounding off the first decimal place.

$$B_2 = \frac{m_{24} - m_{23}}{T_2} \quad \cdots\cdots (13)$$

where, B_2 : sample treatment amount (g/m²)

m_{23} : mass of the wood piece in **4.3.1.2.1 a) 5)** (g)

m_{24} : mass of the treated specimen in **4.3.1.2.2 a) 1)** (g)

T_2 : surface area of the wood piece in **4.3.1.2.1 a) 4)** (m²)

3) The treated specimen shall be 110 g/m² ± 10 g/m² in sample treatment amount and left it at room temperature for at least 7 days as it is.

b) **Non-treated specimen** The non-treated specimen shall be the wood piece specified in **4.3.1.2.1 a)**, and used for the judgement of the activity of test vermin in vermin damage operation.

c) **Number of specimens** The number of specimens shall be 5 in repetition number per one sample for both treated specimen and non-treated specimen.

4.3.1.2.3 Test

a) **Weathering operation** Five pieces of each specimen shall be taken as one set, and the others shall be in accordance with **4.2.1.2.3 a)**.

b) **Specimen with weathering operation finished** Dry the specimen with weathering operation finished in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, leave it in a desiccator for approximately 30 min, and weigh the mass to the nearest 0.01 g.

c) **Vermin damage operation** The vermin damage operation shall be in accordance with **4.3.1.1.3 c)**.

d) **Specimen with vermin damage operation finished** After finishing of the vermin damage operation, take out the specimen from the breeding container, remove the adhered matter on the specimen surface sufficiently, dry it in air for approximately 24 h, then dry it in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, leave it in a desiccator for approximately 30 min, and weigh the mass to the nearest 0.01 g.

4.3.1.2.4 Calculation The calculation shall be as follows:

a) **Mass decrease rate** The mass decrease rate of each specimen shall be calculated according to formula (14), and the mean value shall be obtained and made to an integer by rounding off the first decimal place.

$$L_5 = \frac{m_{25} - m_{26}}{m_{26}} \times 100 \quad \cdots\cdots (14)$$

where, L_5 : mass decrease rate (%)

m_{25} : mass of the specimen in **4.3.1.2.3 b)** (g)

m_{26} : mass of the specimen in **4.3.1.2.3 d)** (g)

b) **Vermin mortality rate** The vermin mortality rate of worker termite shall be calculated according to formula (15), and the mean value shall be obtained and made to an integer by rounding off the first decimal place.

$$M_2 = \frac{D_2}{150} \times 100 \quad \cdots\cdots (15)$$

where, M_2 : vermin mortality rate (%)

D_2 : total mortality number of worker termites in **4.3.1.2.3 c)**

4.3.1.2.5 Effectiveness of test When the average mass decrease rate of the non-treated specimen tested at the same time of the treated specimen in **4.3.1.2.3** is under 20 %, the test shall be carried out again.

4.3.2 Field test

4.3.2.1 Injection treatment use

4.3.2.1.1 Material

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and shall be taken from the same wood in air dried state. Provided that the sapwood of Japanese black pine or Japanese red pine may be used in place of cryptomeria.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm, and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 30 mm × 30 mm at the end surface of lumber and 350 mm in length and the one end shall be scraped by approximately 50 mm to make stake-shaped. The dimensional tolerance shall be ± 0.5 mm for end surface of lumber and ± 2 mm in length.

5) The mass of wood piece shall be weighed to the nearest 0.1 g in air dried state.

4.3.2.1.2 Specimen The specimen shall be separated into two classes such as a treated specimen and a non-treated specimen, and shall be as follows, respectively. In addition, each specimen shall be able to distinguish from other specimen by attaching on the upper part of it with a highly-durable material of plate mentioned with a specimen number.

a) **Treated specimen** The treated specimen shall be as follows:

1) Put the wood piece placed in a beaker in a vacuum desiccator and others, depressurize it, recover to the normal pressure as absorbing the sample, and leave it for a while as it is. Then, take out the wood piece from the sample, wipe it lightly, and immediately weigh the mass to the nearest 0.1 g.

2) Calculate the sample absorption amount of wood piece according to formula (16), and round off the first decimal place to make an integer.

$$C_3 = \frac{m_{28} - m_{27}}{V_3 \times 1\,000} \quad \cdots\cdots (16)$$

where, C_3 : sample absorption amount (kg/m^3)

m_{27} : mass of the wood piece in **4.3.2.1.1 a) 5)** (g)

m_{28} : mass of the treated specimen in **4.3.2.1.2 a) 1)** (g)

V_3 : volume of the wood piece in **4.3.2.1.1 a) 4)** (m^3)

3) Select to take the treated specimen of 700 kg/m^3 or over in the sample absorption amount of wood piece for water soluble or emulsified sample, or 560 kg/m^3 or over for oil based or oil soluble sample, and leave it at a room temperature for 20 days or longer. When the sapwood of Japanese black pine or Japanese red pine is used, that shall be 550 kg/m^3 or over or 440 kg/m^3 or over.

b) **Non-treated specimen** The non-treated specimen shall be the wood piece specified in **4.3.2.1.1 a)** and used for the judgement of the activity of termite in the test place.

c) **Number of specimens** The number of specimens shall be 5 in repetition number per one sample for both treated specimen and non-treated specimen.

4.3.2.1.3 Test

a) **Test place** The test place shall be a habitat of coptotermes formosanus SHIRAKI, the place where its action has been confirmed for long time(10), and a bare ground.

Note (10) The condition where the surrounding woods have been damaged by vermin for one year or longer.

b) **Test method** The treated specimen and non-treated specimen shall be arranged in a lattice shape so that each specimen is at intervals of 0.7 m, and the specimen shall be buried vertically up to 0.3 m in depth under ground. The test period shall be two years.

c) **Judgement of vermin damage degree** The treated specimen and non-treated specimen shall be pulled out from the test place every one year elapsed, the soil on the surface of specimen be removed, and the condition in the ground shall be evaluated according to the following standard.

0 : Sound

10 : Shallow vermin damage on a part of surface

30 : Vermin damage up to the inside on a part of surface

50 : Vermin damage in a wide range of the inside

100 : Collapse of shape caused by vermin damage

4.3.2.1.4 Calculation The calculation shall be as follows:

a) **Average vermin damage degree** The average vermin damage degree of treated specimen shall be calculated according to formula (17), and rounded off the second decimal place.

$$F_1 = \frac{S_1}{5} \times 100 \quad \cdots\cdots (17)$$

where, F_1 : average vermin damage degree

S_1 : total value of vermin damage degree of each specimen according to the specification in **4.3.2.1.3 b**)

b) **Incidence rate of vermin damage** The incidence rate of vermin damage for treated specimen shall be calculated according to formula (18), and rounded off the second decimal place.

$$P_1 = \frac{N_1}{5} \times 100 \quad \cdots\cdots (18)$$

where, P_1 : incidence rate of vermin damage

N_1 : number of the treated specimens damaged by vermin according to **4.3.2.1.3 b**)

c) **Vermin damage index** The vermin damage index for treated specimen shall be calculated according to formula (19) and made to an integer by rounding off the first decimal place.

$$I_1 = F_1 \times P_1 \quad \cdots\cdots (19)$$

where, I_1 : vermin damage index

F_1 : average vermin damage degree according to the specification in **4.3.2.1.4 a**)

P_1 : incidence rate of vermin damage according to the specification in **4.3.2.1.4 b**)

4.3.2.1.5 Effectiveness of test When any vermin damage has not been found on the non-treated specimen even if one year has elapsed from the time of installation of non-treated specimen, the test place shall be moved and the test shall be carried out again.

4.3.2.2 Surface treatment use

4.3.2.2.1 Material

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and shall be taken from the same wood in air dried state. Provided that the sapwood of Japanese black pine or Japanese red pine may be used in place of cryptomeria.

2) The wood piece shall have straight grain in two-ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm, and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece to be used for the specimen in **4.3.2.2.2** shall be 30 mm × 30 mm at the end surface of lumber and 150 mm in length, and the dimensional tolerance shall be ±0.5 mm for the end surface of lumber and ±2 mm for length.

5) The mass of the wood piece to be used for the specimen in **4.3.2.2.2** shall be weighed to the nearest 0.1 g in air dried state.

6) The termite luring stake shall be used for introducing termite in the test place and judging the activity of termite as well, and the shape shall be 30 mm × 30 mm at the end surface of lumber and approximately 350 mm in length, and the one end shall be made stake-shaped by scraping the one end by approximately 50 mm.

b) **Box type container** The box type container shall be constructed by ceramics board or durable rigid synthetic resin plate of 4 mm or over in thickness as shown in figure 2, and the dimensions shall be 0.45 m in width, 0.45 m in depth and 0.30 m in height. A hole shall be opened on the upper surface of the container, the cylinder of 0.15 m in diameter and 0.05 m in height composed of unplasticized polyvinyl chloride pipe specified in **JIS K 6741** or the synthetic resin similar to this shall be installed and the upper lid of slightly larger diameter than this which is composed of the material without deterioration during testing period shall be covered. The appropriate space shall be provided between the cylinder and the upper lid to prevent the excess rise of temperature and humidity in the box type container.

In addition, the joint part shall be sealed by water-proofing material to prevent the penetration of rain water. The flower pot for horticulture(11) as shown in figure 3 may be used in place of a box type container.

Note (11) That shall be No. 13 flat type flower pot (unglazed pottery).

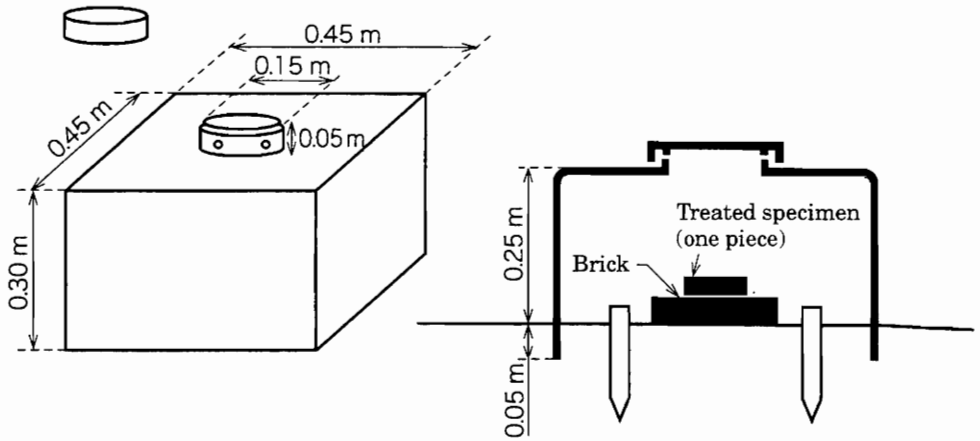

Figure 2 Box type container for field test

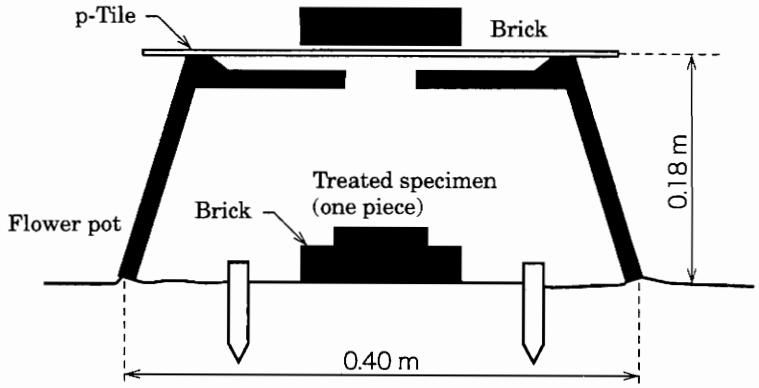

Figure 3 Flower pot for field test

4.3.2.2.2 Specimen The specimen shall be one class of a treated specimen, and be as follows. Each specimen shall be made to distinguish from other specimen by attaching a highly-durable material of plate mentioned with a symbol number.

a) **Treated specimen** The treated specimen shall be as follows:

1) The wood piece shall be treated by coating, spraying or immersing the sample, and the mass shall be weighed to the nearest 0.01 g. Provided that, for immersion treatment, the mass shall be weighed immediately after the surface of wood piece treated is lightly wiped with the filter paper (for chemical analysis) specified in **JIS P 3801**.

2) The sample treatment amount of wood piece shall be calculated according to formula (20), and made to an integer by rounding off the first decimal place.

$$B_3 = \frac{m_{30} - m_{29}}{T_3} \quad \cdots\cdots (20)$$

where, B_3 : sample treatment amount (g/m^2)

m_{29} : mass of the wood piece in **4.3.2.2.1 a) 5)** (g)

m_{30} : mass of the specimen in **4.3.2.2.2 a) 1)** (g)

T_3 : surface area of the wood piece in **4.3.2.2.1 a) 4)** (m^2)

b) **Number of specimens** The number of specimens shall be 5 in repetition number per one sample.

4.3.2.2.3 Test

a) **Test place** The test place shall be in accordance with **4.3.2.1.3 a)**.

b) **Test methods** Arrange the common brick specified in **JIS R 1250** or the brick equivalent to this on the ground surface at intervals of approximately 1 m, and place one piece of treated specimen on it. Strike two termite luring stakes into the ground up to 0.3 m in depth near the brick vertically. Further, install a box type container so that its lower part is buried up to 0.05 m in the ground, and make the specimen covered. The testing period shall be two years.

c) **Judgement of vermin damage degree** The vermin damage degree of treated specimen shall be evaluated according to **4.3.2.1.3 c)** every one year elapsed.

4.3.2.2.4 Calculation The calculation shall be as follows:

a) **Average vermin damage degree** The average vermin damage degree of treated specimen shall be calculated according to formula (21) and rounded off the second decimal place.

$$F_2 = \frac{S_2}{5} \quad \cdots\cdots (21)$$

where, F_2 : average vermin damage degree

S_2 : total value of vermin damage degree of each specimen according to specification of **4.3.2.2.3 b**)

b) **Incidence rate of vermin damage** The incidence rate of vermin damage of treated specimen shall be calculated according to formula (22) and rounded off the second decimal place.

$$P_2 = \frac{N_2}{5} \quad \cdots\cdots (22)$$

where, P_2 : incidence rate of vermin damage

N_2 : number of treated specimens damaged by vermin in **4.3.2.2.3 b**)

c) **Vermin damage index** The vermin damage index of treated specimen shall be calculated according to formula (23), and made to an integer by rounding off the first decimal place.

$$I_2 = F_2 \times P_2 \quad \cdots\cdots (23)$$

where, I_2 : vermin damage index

F_2 : average vermin damage degree according to the specification in **4.3.2.2.4 a**)

P_2 : incidence rate of vermin damage according to the specification in **4.3.2.2.4 b**)

4.3.2.2.5 Effectiveness of test When any vermin damage has not been found in the termite luring stake even if one year has elapsed from the time of installation of the termite luring stake, the test place shall be moved and the test shall be carried out again.

4.4 Iron corrosion property test

4.4.1 Injection treatment use

4.4.1.1 Material

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and shall be taken from the same wood in air dried state.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 20 mm × 20 mm at end surface of lumber and 45 mm in length. The dimensional tolerance of end surface of lumber and length shall be ± 0.5 mm.

5) Dry the wood piece in a circulating type dryer at 60 °C ± 2 °C in temperature for 48 h, place it in a desiccator for approximately 30 min as it is, then weigh the mass to the nearest 0.01 g and store it in a desiccator so as not to be humidified.

b) **Nails** The nails shall be N38 (38 mm in length) of iron wire nail specified in **JIS A 5508** and a clean one. The nails, before testing, shall be decreased by *n*-hexane specified in **JIS K 8848** and then dried.

4.4.1.2 Specimen The specimen shall be separated into two classes such as a treated specimen and a non-treated specimen, and shall be as follows, respectively.

a) **Treated specimen**

1) Put the wood piece in a beaker in a vacuum desiccator and others, depressurize it, recover to the normal pressure as absorbing the sample, and leave it for a while as it is. Then, take out the wood piece from the sample, wipe it lightly, and immediately weigh the mass to the nearest 0.01 g.

2) Calculate the sample absorption rate of wood piece according to formula (24), and round off the first decimal place to make an integer.

$$A_4 = \frac{m_{32} - m_{31}}{m_{31}} \times 100 \quad \cdots\cdots (24)$$

where, A_4 : sample absorption rate (%)

m_{31} : mass of the wood piece in **4.4.1.1 a) 5)** (g)

m_{32} : mass of the treated specimen in **4.4.1.2 a) 1)** (g)

3) Select to take the specified number of treated specimens of (250 ± 10) % in sample absorption rate of wood piece for water soluble or emulsified sample, or (200 ± 10) % in sample absorption rate for oil based or oil soluble sample, and leave it at a room temperature for 20 days or longer as it is.

b) **Non-treated specimen** The non-treated specimen shall be in accordance with **4.4.1.1 a)**.

c) **Number of specimens** The number of specimens shall be 5 in repetition number per one sample for both a treated specimen and a non-treated specimen.

4.4.1.3 Test The test shall be as follows:

a) Weigh two nails as one set to the nearest 0.001 g, and strike the nail up to its head vertically at two points dividing a diagonal line of end surface of lumber into three equal parts so as not to be split in a non-treated specimen and a treated specimen respectively.

b) Put the specimen struck with nails in a desiccator (18 cm in inside diameter) regulated at 40 °C ± 2 °C in temperature and 97 % in relative humidity previously by using the saturated solution, coexisted with crystal of potassium sulfate specified in **JIS K 8962**, and leave it as maintaining the temperature for 10 days as it is.

c) Pull out the nails from each specimen, immediately immerse them in 10 % (mass percentage) of diammonium hydrogen citrate solution, prepared by using diammonium hydrogen citrate specified in **JIS K 8284**, in a beaker, cover it with a watch glass, boil them under the same condition for 20 min, then wash them by water, wipe them with cloth, remove iron rust sufficiently, dry them, and weigh the mass to the nearest 0.001 g.

4.4.1.4 Calculation The calculation shall be as follows:

a) **Mass decrease rate** The mass decrease rate of nails of each specimen shall be calculated according to formula (25) and the mean value shall be obtained.

The calculation of the average ($\bar{x}$) and standard deviation (s) of mass decrease rate shall be carried out according to **JIS Z 9041-1**, and rounded off the second decimal place.

$$L_6 = \frac{m_{33} - m_{34}}{m_{33}} \times 100 \quad \cdots\cdots (25)$$

where, L_6 : mass decrease rate (%)

m_{33} : mass of the specimen in **4.4.1.3 a**) (g)

m_{34} : mass of the specimen in **4.4.1.3 c**) (g)

b) **Iron corrosion ratio** The iron corrosion ratio of specimen shall be calculated according to formula (26), and rounded off the second decimal place.

$$E_1 = \frac{L_8}{L_7} \quad \cdots\cdots (26)$$

where, E_1 : iron corrosion ratio

L_7 : average mass decrease rate of nails of non-treated specimen (%)

L_8 : average mass decrease rate of nails of treated specimen (%)

4.4.1.5 Effectiveness of test When the average mass decrease rate of nails of non-treated specimen tested at the same time of treated specimen in **4.4.1.3** is 2.0 % or over, the test shall be carried out again.

4.4.2 Surface treatment use

4.4.2.1 Material

a) **Wood piece** The wood piece shall be as follows:

1) The wood piece shall be a normal and sound cryptomeria sapwood, and shall be taken from the same wood in air dried state.

2) The wood piece shall have straight grain in two ways, and be finished smoothly and accurately by planing.

3) The number of annual rings of wood piece shall be 3 to 5 per 10 mm and the density, when dried, shall be within the range between 0.25 g/cm^3 and 0.32 g/cm^3.

4) The shape of wood piece shall be 20 mm × 20 mm of end surface of lumber and 40 mm in length. The dimensional tolerance of end surface of lumber and length shall be ± 0.5 mm.

5) Dry the wood piece in a circulating type drier at 60 °C ± 2 °C for 48 h, place it in a desiccator for approximately 30 min as it is, then weigh the mass to the nearest 0.01 g and store it in a desiccator so as not to be humidified.

b) **Nails** The nails shall be in accordance with **4.4.1.1 b**).

4.4.2.2 Specimen The specimen shall be separated into two classes such as a treated specimen and a non-treated specimen, and shall be as follows, respectively.

a) **Treated specimen**

1) The wood piece shall be treated by coating, spraying or immersing the sample, and the mass shall be weighed to the nearest 0.01 g. Provided that, for immersion treatment, the mass shall be weighed immediately after the surface of wood piece treated is lightly wiped with the filter paper (for chemical analysis) specified in **JIS P 3801**.

2) The sample treatment amount of wood piece shall be calculated according to formula (27) and made to an integer by rounding off the first decimal place.

$$B_4 = \frac{m_{36} - m_{35}}{T_4} \quad \cdots\cdots (27)$$

where, B_4 : sample treatment amount (g/m^2)

m_{35} : mass of the wood piece in **4.4.2.1 a**) **5**) (g)

m_{36} : mass of the treated specimen in **4.4.2.2 a**) **1**) (g)

T_4 : surface area of the wood piece in **4.4.2.1 a**) **4**) (m^2)

3) The treated specimen shall be 110 g/m^2 ± 10 g/m^2 in sample treatment amount of wood piece and left it at a room temperature for 7 days or longer.

b) **Non-treated specimen** The non-treated specimen shall be in accordance with **4.4.2.1 a**).

c) **Number of specimens** The number of specimens shall be 5 in repetition number per one sample for both a treated sample and a non-treated sample.

4.4.2.3 Test The test shall be as follows.

a) Take 2 nails as one set, weigh the mass to the nearest 0.001 g, place it between the grain face of two pieces of non-treated specimen and treated specimen respectively so as to expose the top of nails from the specimen, and cave in the nails in the specimen by compressing to fix them.

b) Put the specimen struck with nails in a desiccator (180 mm in inside diameter) regulated at 40 °C ± 2 °C in temperature and 97 % in relative humidity previously by using the saturated solution, coexisted with crystal of potassium sulfate specified in **JIS K 8962**, and leave it as maintaining the temperature for 10 days as it is.

c) Pull out the nails from each specimen, immediately immerse them in 10 % (mass percentage) of diammonium hydrogen citrate solution, prepared by using diammonium hydrogen citrate specified in **JIS K 8248**, in a beaker, cover it with a watch glass, boil them under the same condition for 20 min, then wash them well by water, wipe them with cloth, remove iron rust sufficiently, dry them, and weigh the mass to the nearest 0.001 g.

4.4.2.4 Calculation The calculation shall be as follows:

a) **Mass decrease rate** The mass decrease rate of nails of each specimen shall be calculated according to formula (28), and the mean value shall be obtained.

The calculation of the average ($\bar{x}$) and standard deviation (s) of mass decrease rate shall be carried out according to **JIS Z 9041-1** and rounded off the second decimal place.

$$L_9 = \frac{m_{37} - m_{38}}{m_{37}} \times 100 \quad \cdots\cdots (28)$$

where, L_9 : mass decrease rate (%)

m_{37} : mass of the nails in **4.4.2.3 a**) (g)

m_{38} : mass of the nails in **4.4.2.3 c**) (g)

b) **Iron corrosion ratio** The iron corrosion ratio shall be calculated according to formula (29), and rounded off the second decimal place.

$$E_2 = \frac{L_{10}}{L_{11}} \quad \cdots\cdots (29)$$

where, E_2 : iron corrosion ratio

L_{10} : average mass decrease rate of the nails of non-treated specimen (%)

L_{11} : average mass decrease rate of the nails of treated specimen (%)

4.4.2.5 Effectiveness of test When the average mass decrease rate of the nails of non-treated specimen tested at the same time of treated specimen in **4.4.2.3** is 2.0 % or over, the test shall be carried out again.

5 Record of test results The record of test results shall be as follows:

5.1 Antiseptic performance

5.1.1 Indoor test

5.1.1.1 Injection treatment use The recording method for the antiseptic performance test of wood preservatives for injection treatment (for indoor test and injection treatment) shall be in accordance with table 3.

Table 3 Recording method for antiseptic performance test (for indoor test and injection treatment)

Name of test chemicals _____ Name of solvent or diluent _____

Specimen	Name of test fungus	Chemicals absorption amount [12] (kg/m³)	Mass decrease rate (%)		Remarks [13]
			Average	Standard deviation	
Treated specimen	Fomitopsis palustris				
	Trametes versicolor				
Non-treated specimen	Fomitopsis palustris				
	Trametes versicolor				

Notes [12] The chemicals absorption amount of each specimen shall be calculated according to formula (30), and the mean value shall be expressed by three significant figures.

$$R_1 = \frac{(m_2 - m_1)}{V_4} \times \frac{c_1}{100} \quad \cdots\cdots (30)$$

where, R_1 : chemicals absorption amount (kg/m³)

m_1 : mass of the wood piece in **4.2.1.1.1 a) 5)** (kg)

m_2 : mass of the treated specimen in **4.2.1.1.2 a) 1)** (kg)

c_1 : concentration of the sample in **4.2.1.1.2 a) 1)** (mass percentage %)

V_4 : volume of the wood piece in **4.2.1.1.1 a) 4)** (m³)

[13] The specially mentioned items such as the growth state of test fungus, dryness degree of culture medium, contact condition of mycelium to treated specimen, degree of covering shall be mentioned.

5.1.1.2 Surface treatment use The recording method for the antiseptic performance test of wood preservatives for surface treatment (for indoor test and surface treatment) shall be in accordance with table 4.

Table 4 Recording method for antiseptic performance test (for indoor test and surface treatment)

Name of test chemicals _____ Name of solvent or diluent _____ Specified concentration (mass percentage %) _____

Specimen	Name of test fungus	Sample treatment amount (g/m^2)	Mass decrease rate (%)		Remarks (14)
			Average	Standard deviation	
Treated specimen	Fomitopsis palustris				
	Trametes versicolor				
Non-treated specimen	Fomitopsis palustris				
	Trametes versicolor				

Note (14) The specially mentioned items such as the growth state of test fungus, dryness degree of culture medium, contact condition of mycelium to treated specimen, degree of covering shall be mentioned.

5.1.2 Fungus cellar test

5.1.2.1 Culture bottle test The recording method for the antiseptic performance test of wood preservatives for injection treatment (fungus cellar test and culture bottle test) shall be in accordance with table 5.

Table 5 Recording method for antiseptic performance test (fungus cellar test and culture bottle test)

Name of test chemicals _____ Name of solvent or diluent _____

Specimen	Chemicals absorption amount (15) (kg/m^3)	Mass decrease rate (%)		Remarks (16)
		Average	Standard deviation	
Treated specimen				
Non-treated specimen				

Notes (15) The chemicals absorption amount of each specimen shall be calculated according to formula (31), and the mean value shall be expressed by three significant figures.

$$R_2 = \frac{(m_{12} - m_{11})}{V_5} \times \frac{c_2}{100} \quad \cdots\cdots (31)$$

where, R_2 : chemicals absorption amount (kg/m^3)

m_{11} : mass of the wood piece in **4.2.2.1.1 a) 5)** (kg)

m_{12} : mass of the treated specimen in **4.2.2.1.2 a) 1)** (kg)

c_2 : concentration of the sample in **4.2.2.1.2 a) 1)** (mass percentage %)

V_5 : volume of the wood piece in **4.2.2.1.1 a) 4)** (m^3)

(16) The specially mentioned items such as characteristics of specimen shall be mentioned.

5.1.2.2 Rot vessel test The recording method for the antiseptic performance test of wood preservatives for injection treatment (fungus cellar test and rot vessel test) shall be in accordance with table 6.

Table 6 Recording method for antiseptic performance test (fungus cellar test and rot vessel test)

Name of test chemicals _____ Name of solvent or diluent _____

Specimen	Chemicals absorption amount [17] (kg/m³)	Damaged degree		Durable year of specimen (year)	Remarks [18]
		Average	Standard deviation		
Treated specimen					
Non-treated specimen					

Notes [17] The chemicals absorption amount of each specimen shall be calculated according to formula (32), and the mean value shall be expressed by three significant figures.

$$R_3 = \frac{(m_{16} - m_{15})}{V_1} \times \frac{c_3}{100} \quad \cdots\cdots (32)$$

where, R_3 : chemicals absorption amount (kg/m³)

m_{15} : mass of the wood piece in **4.2.2.2.1 a) 5)** (kg)

m_{16} : mass of the treated specimen in **4.2.2.2.2 a) 1)** (kg)

c_3 : concentration of the sample in **4.2.2.2.2 a) 1)** (mass percentage %)

V_1 : volume of the wood piece in **4.2.2.2.1 a) 4)** (m³)

[18] The specially mentioned items such as the growth state of fungus, dryness degree of soil fungus bed, covering degree of mycelium to treated specimen shall be mentioned.

5.1.3 Field test The recording method for the antiseptic performance test of wood preservatives for injection treatment (field test) shall be in accordance with table 7.

Table 7 Recording method for antiseptic performance test (field test)

Name of test chemicals _____ Name of solvent or diluent _____ Testing period _____ year

Specimen	Chemicals absorption amount [19] (kg/m³)	Damaged degree		Durable year of specimen (year)	Remarks [20]
		Average	Standard deviation		
Treated specimen					
Non-treated specimen					

Notes [19] The chemicals absorption amount of each specimen shall be calculated according to formula (33), and the mean value shall be expressed by three significant figures.

$$R_4 = \frac{(m_{18} - m_{17})}{V_2} \times \frac{c_4}{100} \quad \cdots\cdots (33)$$

where, R_4 : chemicals absorption amount (kg/m³)

m_{17} : mass of the wood piece in **4.2.3.1 a) 5)** (kg)

m_{18} : mass of the treated specimen in **4.2.3.2 a) 1)** (kg)

c_4 : concentration of the sample in **4.2.3.2 a) 1)** (mass percentage %)

V_2 : volume of the wood piece in **4.2.3.1 a) 4)** (m³)

(20) The specially mentioned items such as the damage of specimen shall be mentioned.

5.2 Termite proofing performance

5.2.1 Indoor test

5.2.1.1 Injection treatment use The recording method for the termite proofing performance test of wood preservatives for injection treatment (for indoor test and injection treatment) shall be in accordance with table 8.

Table 8 Recording method for termite proofing performance test (for indoor test and injection treatment)

Name of test chemicals _____ Name of solvent or diluent _____

Specimen	Chemicals absorption amount (21) (kg/m³)	Vermin mortality rate (%)		Mass decrease rate (%)		Remarks (22)
		Average	Min.–Max.	Average	Min.–Max.	
Treated specimen						
Non-treated specimen						

Notes (21) The chemicals absorption rate of each specimen shall be calculated according to formula (34), and the mean value shall be expressed by three significant figures.

$$R_5 = \frac{(m_{20} - m_{19})}{V_3} \times \frac{c_5}{100} \quad \cdots\cdots (34)$$

where, R_5 : chemicals absorption amount (kg/m³)

m_{19} : mass of the wood piece in **4.3.1.1.1 a) 5)** (kg)

m_{20} : mass of the treated specimen in **4.3.1.1.2 a) 1)** (kg)

c_5 : concentration of the sample in **4.3.1.1.2 a) 1)** (mass percentage %)

V_3 : volume of the wood piece in **4.3.1.1.1 a) 4)** (m³)

(22) The specially mentioned items such as the observation items during testing period, the number of days when all termites have died, repellency shall be mentioned.

5.2.1.2 Surface treatment use The recording method for the termite proofing performance test of wood preservatives for surface treatment (for indoor test and surface treatment) shall be in accordance with table 9.

Table 9 Recording method for termite proofing performance test (for indoor test and surface treatment)

Name of test chemicals _____ Name of solvent or diluent _____ Specified concentration (mass percentage %) _____

Specimen	Sample treatment amount (g/m^2)	Vermin mortality rate (%)		Mass decrease rate (%)		Remarks [23]
		Average	Min.–Max.	Average	Min.–Max.	
Treated specimen						
Non-treated specimen						

Note [23] The specially mentioned items such as the observation items during testing period, the number of days when all termites have died, repellency shall be mentioned.

5.2.2 Field test

5.2.2.1 Injection treatment use The recording method for the termite proofing performance test of wood preservatives for injection treatment (for field test and injection treatment) shall be in accordance with table 10.

Table 10 Recording method for termite proofing performance test (for field test and injection treatment)

Name of test chemicals _____ Name of solvent or diluent _____

Chemicals absorption amount [24] (kg/m^3)	Class	Vermin damage degree		Remarks [25]
		1st year	2nd year	
	Treated specimen 1			
	2			
	3			
	4			
	5			
	Vermin damage index of treated specimen			

Notes [24] The chemicals absorption amount of each specimen shall be calculated according to formula (35), and the mean value shall be expressed by three significant figures.

$$R_6 = \frac{(m_{28} - m_{27})}{V_3} \times \frac{c_6}{100} \quad \cdots\cdots (35)$$

where, R_6 : chemicals absorption amount (kg/m^3)

m_{27} : mass of the wood piece in **4.3.2.1.1 a) 5)** (kg)

m_{28} : mass of the treated specimen in **4.3.2.1.2 a) 1)** (kg)

c_6 : concentration of the sample in **4.3.2.1.2 a) 1)** (mass percentage %)

V_3 : volume of the wood piece in **4.3.2.1.1 a) 4)** (m^3)

(25) The specially mentioned items such as the vermin damage state of non-treated stake, observation items during testing period shall be mentioned.

5.2.2.2 Surface treatment use The recording method for the termite proofing performance test of wood preservatives for surface treatment (for field test and surface treatment) shall be in accordance with table 11.

Table 11 Recording method for termite proofing performance test (for field test and surface treatment)

Name of test chemicals _____ Name of solvent or diluent _____ Specified concentration (mass percentage %) _____

Sample treatment amount (g/m^2)	Class	Vermin damage degree		Remarks (26)
		1st year	2nd year	
	Treated specimen 1			
	2			
	3			
	4			
	5			
	Vermin damage index of treated specimen			

Note (26) The specially mentioned items such as the vermin damage state of termite luring stake, observation items during testing period shall be mentioned.

5.3 Iron corrosion property

5.3.1 Injection treatment use The recording method for the iron corrosion property test of wood preservatives for injection treatment (for injection treatment) shall be in accordance with table 12.

Table 12 Recording method for iron corrosion property test (for injection treatment)

Name of test chemicals _____ Name of solvent or diluent _____

Specimen	Chemicals absorption amount (27) (kg/m^3)	Mass decrease rate (%)		Iron corrosion ratio	Remarks
		Average	Standard deviation		
Treated specimen					
Non-treated specimen					

Note (27) The chemicals absorption amount of each specimen shall be calculated according to formula (36), and the mean value shall be expressed by three significant figures.

$$R_7 = \frac{(m_{32} - m_{31})}{V_7} \times \frac{c_7}{100} \quad \cdots\cdots (36)$$

where, R_7 : chemicals absorption amount (kg/m^3)

m_{31} : mass of the wood piece in **4.4.1.1 a) 5)** (kg)

m_{32} : mass of the treated specimen in **4.4.1.2 a) 1)** (kg)

c_7 : concentration of the sample in **4.4.1.2 a) 1)** (mass percentage %)

V_7 : volume of the wood piece in **4.4.1.1 a) 4)** (m^3)

5.3.2 Surface treatment use The recording method for the performance according to the iron corrosion property test of wood preservatives for surface treatment (for surface treatment) shall be in accordance with table 13.

Table 13 Recording method for iron corrosion property test (for surface treatment)

Name of test chemicals _____ Name of solvent or diluent _____ Specified concentration (mass percentage %) _____

Specimen	Sample treatment amount (g/m^2)	Mass decrease rate (%)		Iron corrosion ratio	Remarks
		Average	Standard deviation		
Treated specimen					
Non-treated specimen					

6 Performance requirements The performance of wood preservatives shall be obtained according to the test methods in clause **4** and the record of test results in clause **5**, and be conformed to the performance requirements as shown in table 14.

Table 14 Performance requirements for wood preservatives

Classification of performance and test methods			Performance item	Performance requirements
Antiseptic performance	Indoor test	Injection treatment use	Mass decrease rate (%)	3 max.
		Surface treatment use	Mass decrease rate (%)	3 max.
	Fungus cellar test	Culture bottle test	Mass decrease rate (%)	—
		Rot vessel test	Durable year	—
	Field test		Durable year	—
Termite proofing performance	Indoor test	Injection treatment use	Mass decrease rate (%)	3 max.
		Surface treatment use	Mass decrease rate (%)	3 max.
	Field test	Injection treatment use	Vermin damage index	Under 10 [28]
		Surface treatment use	Vermin damage index	Under 10 [28]
Iron corrosion property	Pressurizing treatment use		Iron corrosion ratio	2.0 max.
	Surface treatment use		Iron corrosion ratio	2.0 max.

Note [28] When the treated specimen indicating 50 or more in vermin damage degree exists, it shall not be regarded as to satisfy the performance requirements.

Attached Table 1 Normative references

JIS A 5009 *Vermiculites*

JIS A 5508 *Nails*

JIS K 0557 *Water used for industrial water and wastewater*

JIS K 1570 *Wood preservatives*

JIS K 5551 *Epoxy resin paint*

JIS K 6741 *Unplasticized poly (vinyl chloride) (PVC-U) pipes*

JIS K 8222 *Sea sand (Sand, washed)*

JIS K 8284 *Diammonium hydrogen citrate*

JIS K 8824 *D(+)-Glucose*

JIS K 8848 *Hexane*

JIS K 8962 *Potassium sulfate*

JIS P 3801 *Filter paper (for chemical analysis)*

JIS R 1250 *Common bricks*

JIS T 6605 *Dental stone*

JIS Z 9041-1 *Statistical interpretation of data—Part 1: Statistical presentation of data*

Japanese Pharmacopoeia *Absorbent cotton*

Annex (normative)

Another method for the antiseptic performance test (indoor test) and termite proofing performance test (indoor test)

Introduction This annex is to describe another method for the antiseptic performance test (indoor test) and termite proofing performance test (indoor test) to evaluate the antiseptic and termite proofing performance of wood preservatives to be used in the limited service condition, without any modification except for carrying out the following weathering operation, and shall be dealt with as a part of this specification.

When the test results are recorded, it shall clearly be mentioned that this test is carried out according to the annex (normative).

1 Scope This annex (normative) specifies the antiseptic performance test (indoor test) and termite proofing performance test (indoor test) to evaluate the antiseptic performance and termite proofing performance of wood preservatives to be used for the wood which may be suddenly placed under a highly-humid circumference with moisture little supplied usually such as the wood for buildings which are intercepted from wind and rain by roof or outer wall board and others and are not directly contacted with the ground.

Remarks : This test results shall be the antiseptic performance and termite proofing performance limited by indoor test and not guarantee the antiseptic/termite proofing performances under such service condition as moisture is supplied to wood, therefore care shall be seriously taken to the handling so as to specify clearly the effect to the user side.

2 Antiseptic performance and termite proofing performance These shall be in accordance with the text, except for the items as shown below.

a) The weathering operation in **4.2.1.1.3 a**) or **4.3.1.1.3 a**) shall be carried out so that each specimen is placed gently in a circulating type dryer at 60 °C ± 2 °C for 7 days as it is and the volatile content is volatilized.

b) The following item shall be clearly mentioned.

This test results is in accordance with the annex (normative).

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